En	trance Exam	ination Teac	for Ac	dmissic)epartn	on to th nents, 2	e P.G. 2024	Cours	es in th	10
	CSS								
COMPUTATIONAL BIOLOGY WITH SPECIALIZATION IN (COMPUTER AIDED DRUG DESIGN/NGS DATA ANALYTICS)									
			<u>Gener</u>	al Instru	<u>ctions</u>				
1. The	Question Paper	[.] is havin	g 100 O	bjective	Question	s, each	carrying	one ma	rk.
2. The	answers are to	be (✔) 't	ick mark	ed' only	in the "F	Respons	e Sheet	" provide	ed.
3. <u>Neg</u> a	ative marking :	0.25 ma	arks will	be dedu	cted for e	each wro	ong ansv	ver.	
Time : 2 H	lours						Ν	lax. Mar	ks : 100
To be fille	ed in by the Car	ndidate							
Register	in Figures								
Number	in words								

Choose appropriate answer from the options in the questions.

(100 × 1 = 100 marks)

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Code No.

- Which one of the following conditions will switch on Lac operon in E. coli? 1.
 - + Glucose, + Lactose Α.

- Β. + Glucose, - Lactose
- C. - Glucose, - Lactose
- Glucose, + Lactose D.

DONOTWRITEHERE

Adenosine, guanosine, thymidine, uridine, uridine are all ------ but 2. adenylic acid, guanylic acid, thymidylic acid, uridylic acid, cytidylic acids are

- Nucleotides, Nucleosides Α.
- Nucleosides, Nucleotides B.
- C. Nucleotides, Nucleic acids
- D. Nucleosides, Nucleic acids
- In a DNA molecule, the phosphate group is attached to carbon of the sugar 3. residue of its own nucleotide and ———— carbon of the sugar residue of the next nucleotide by ----- bonds.
 - Α. 5', 3, phosphodiester B. 5, 3', glycosidic
 - C. 3', 5', phosphodiester
- D. 3', 5', glycosidic

4.	Pyri	midines have nitrogen atoms at —		positions.
	Α.	1', 3', 7', 9'	В.	1', 5', 7', 9'
	C.	1', 3'	D.	1', 9'
5.	On is s	a ribosome, the mRNA is read fron ynthesized from ————.	n ——	————— and the polypeptide chain
	Α.	3' to 5'; C to N terminus	В.	3' to 5'; N to C terminus
	C.	5' to 3'; N to C terminus	D.	5' to 3'; C to N terminus
6.	Dur frag	ing DNA replication the synthes ments known as:	sis of	f leading strand of DNA results in
	Α.	Satellite segments	В.	Kornberg segment
	C.	Double-helix segment	D.	Okazaki fragment
7.	Euk	aryotic RNA polymerase II transcri	bes:	
	Α.	rRNA and tRNA genes	В.	mRNA and tRNA genes
	C.	mRNA and 5S rRNA genes	D.	mRNA, miRNA and snRNA genes
8.	The	melting temperature (tm) of DNA i	s hig	her when the content of:
	Α.	A : T base pairs is higher		
	Β.	G : C base pairs is higher		
	C.	G : C base pairs is lower		
	D.	A : T base pairs is same as G : C	base	e pairs
9.	The	mRNA codon of valine is:		
	Α.	UGG	В.	GUG
	C.	CCA	D.	TTG
10.	On of c	sequence analysis of a double stra ytosine, C was 20%. What is the a	indec mour	I DNA, the results showed the content it of A and T put together?
	Α.	20%	В.	30%
	C.	50%	D.	60%

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- 11. The length of a coding region in an mRNA is 897 bases. How many amino acids will be there in the polypeptide synthesized using this mRNA?
 - A. 297 B. 298
 - C. 299 D. 897
- 12. Origin of replication usually contains
 - A. GC rich sequences
 - B. Both AT and GC rich sequences
 - C. No particular stretch of sequences
 - D. AT rich sequences
- 13. Which of the following enzymes is NOT a part of the DNA replication machinery?
 - A. DNA helicase B. Primase
 - C. DNA polymerase D. DNA endonuclease
- 14. The term Gene was coined by:
 - A. H. Khorana B. A. Kornberg
 - C. W. Johannsen D. M. Nirenberg
- 15. In electrophoresis, DNA would migrate towards:
 - A. Anode or positive electrode B. Anode or negative electrode
 - C. Cathode or negative electrode D. None of the above
- 16. The central dogma of molecular biology was proposed by:
 - A. Rosalind Franklin B. Francis Crick
 - C. Alec Jeffrey D. Hargobind Khorana

17. Human genome project was initiated in ————.

- A. 1985 B. 2000
- C. 1990 D. 2003
- 18. The component present in both nucleotides and nucleosides
 - A. Sugar B. Phosphate
 - C. Nitrogenous base D. Both (A) and (C)

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19. In cytoplasm, synthesis of protein at ribosomes is called:

- A. Translation B. Transcription
- C. Replication D. Transduction

20. The first protein sequenced by Frederick Sanger was:

- A. Insulin B. Hemoglobin
- C. Myosin D. Myoglobin
- 21. What is the purpose of the "if" statement in programming?
 - A. To repeat a block of code
 - B. To define a function
 - C. To make a decision based on a condition
 - D. To declare a variable
- 22. #include <stdio.h>
- int main() { int i = 1, 2, 3;printf("%d", i); return 0; } Α. 1 Β. 3 C. Compile time error Garbage value D. 23. In relational databases, which term uniquely identifies each row in a table? Α. Attribute Β. Tuple C. Foreign Key Primary Key D.
- 24. What is the binary equivalent of the decimal number 42?

Α.	100100	В.	101010
C.	110110	D.	111010

- 25. What term describes a blueprint for creating objects in object-oriented programming?
 - Class Object Α. Β.
 - C. Method D. Attribute
- 26. _____ is a type of memory circuitry that holds the computer's start-up routine.
 - Α. RIM (Read Initial Memory) B. RAM (Random Access Memory)
 - C. ROM (Read Only Memory) Cache Memory D.
- 27. An ASCII is a character-encoding scheme that is employed by personal computers in order to represent various characters, numbers and control keys that the computer used selects on the keyboard. ASCII is an acronym for
 - American Standard Code for Information Interchange Α.
 - B. American Standard Code for Intelligent Information
 - C. American Standard Code for Information Integrity
 - D. American Standard Code for Isolated Information
- 28. Which data structure follows the Last In, First Out (LIFO) principle?
 - Α. Queue Β. Stack
 - C. Linked List D. Array
- 29. Which protocol is used for secure communication over a computer network, providing encrypted connections?
 - **FTP** Α. B. HTTP C. SSH D. Telnet
- 30. Which among the following is not a security/privacy risk?
 - Virus Α. Spam B.
 - C. Phishing Hacking D.
- 31. A compiler is used to convert the following to object code which can be executed
 - Low level language Assembly language Α. B.
 - C. High level language Natural Language D.

- 32. Which AI technique is inspired by the process of natural selection and genetics?
 - Expert Systems Genetic Algorithms Α. B.
 - C. **Neural Networks** D. **Reinforcement Learning**
- 33. Which type of machine learning algorithm is suitable for handling sequential data, such as time series or natural language processing tasks?
 - Α. Supervised Learning B. **Unsupervised Learning**
 - C. Reinforcement Learning D. Recurrent Neural Networks (RNNs)
- 34. What is the purpose of the convolution operation in a Convolutional Neural Network (CNN)?
 - Α. To flatten the input data
 - B. To compute the gradient during backpropagation
 - C. To extract features from the input data
 - D. To compute the final classification scores
- 35. Which of the following is an example of an unsupervised learning algorithm?
 - Linear Regression Β. **Decision Trees** Α.
 - C. K-Means Clustering D. Support Vector Machines
- 36. Which element possesses properties of both alkali metal and halogen?
 - Α. Sodium Hydrogen Β.
 - C. Chlorine Helium D.
- 37. The type of hybridisation in BCl₃ molecule
 - SP Sp^2 Α. B. SP³ Sp³d C. D.
- 38. The current age of X and Y are in the ratio of 5:4 respectively. Three years hence the ratio of their ages will become 11:9 respectively. What is Y's present age in years.
 - Α. 24 B 27
 - C. 40 D. 42

39. Find the missing number in the end of the given series: 3, 11, 19, 27, ?

- A. 35 B. 37
- C. 33 D. 41

40. If miles per gallon goes up by 50%, what happens to gallons per mile?

- A. Goes up by 50% B. Goes down by 50%
- C. Goes down by 2/3 D. Goes down by a third

41. The sale of children's bicycles accounted for one-third of total bicycle sales in the China. There was a rise in total market growth by 20% and the sales of children's bicycles are 90% of the previous year. What was the growth in sales of other bicycles relative to the previous year?

- A. 13.5% B. 35%
- C. 47% D. 33%
- 42. ' σ factor' is a part of ———.
 - A. Eukaryotic RNA polymerase
 - C. *E.coli* RNA polymerase
- B. Eukaryotic DNA polymerase
- D. E. coli DNA polymerase

43. 'Rho' is

- A. ATP-dependent
- B. Helicase
- C. Required for transcription termination
- D. All the above
- 44. Which of the following is a DNA binding protein?
 - A. σ factor B. Rho
 - C. Cro D. All the above
- 45. The rRNA genes of eukaryotes are mostly transcribed by
 - A. RNA pol I B. RNA pol II
 - C. RNA pol III D. RNA pol IV

46.	TAT	A box is		
	Α.	Recognised by RNA polymerase	Β.	Recognised by transcription factors
	C.	Is present in the operator region	D.	All the above
47.		is/are required for RNA	. cap	ping.
	Α.	RNA 5' triphosphatase	Β.	Guanine-7-methyl transferase
	C.	2'-O-methyl transferase	D.	All the above
48.	Sma	all Nuclear Ribonuclear proteins		
	Α.	contain RNA	В.	are part of spliceosomes
	C.	are ribozymes	D.	All the above
49.	RNA	Ase activity is exhibited by		
	Α.	Drosha	В.	Telomerase
	C.	Rho	D.	All the above
50.	Ups	tream regulatory elements compris	se of	
	Α.	Transcription factors		
	В.	Factors that enhances DNA replic	atior	1
	C.	Enhancers and silencers		
	D.	5' UTR		
51.	Whi	ch of the following is a polymerase	?	
	Α.	HindIII	Β.	Pfu
	C.	Tfl	D.	Cas9
52.	Mate	ch list A with list B		
		A		В
	(i)	Cas9	(1)	Ribozyme
	(ii)	Terminal uridylyl transferase	(2)	Methylation
	(iii)	Telomerase	(3)	Genome editing
	(iv)	Methyl transferase	(4)	RNA editing
	Α.	(i)-(3), (ii)-(1), (iii)-(4), (iv)-(2)	В.	(i)-(4), (ii)-(3), (iii)-(1), (iv)-(2)
	C.	(i)-(3), (ii)-(4), (iii)-(1), (iv)-(2)	D.	(i)-(4), (ii)-(3), (iii)-(2), (iv)-(1)

- 53. A restriction enzyme with a 8 bp recognition site will cut on average every
 - A. 4096 bp B.
 - C. 36 bp D. None of the above
- 54. Pseudouridine, methylguanosine, dimethylguanosine and methylinosine are seen in

D.

- A. Synthetic DNA B. tRNA
- C. MIRNA
- 55. $tRNA_{f}^{Met}$ is seen in
 - A. E. coil
 - C. Apium graveolens
- 56. rRNA function to bind to
 - A. tRNA
 - C. miRNA
- 57. Peptidyl transferase activity is
 - A. due to 23S rRNA
 - C. transfer of growing polypeptide
- 58. Human genome contains
 - A. 70% junk DNA
 - C. 14% coding region D.
- 59. Cytosine methylation is required for
 - A. Epigenetic regulation
 - B. Genomic imprinting
 - C. Activation-deactivation of chromosomes
 - D. All the above

60. Single-strand binding proteins

- A. are required during DNA replication
- B. exhibit helicase activity
- C. are also known as topoisomerase I
- D. are also known as topoisomerase II

SiRNA

1296 bp

- B. Spinacia oleracea
- D. Amoeba
- B. Shine-Dalgarno sequence
- D. All the above
- B. due to 50S subunit of ribosome
- D. all the above
- B. 70% coding region
- D. 3% repetitive DNA

61. DNA primase is a

Α.	DNA polymerase	В.	Recombinase
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- C. RNA polymerase D. DNA helicase
- 62. An aircraft flies 930 miles in 75 minutes. How many miles does it fly in 4 hours 45 minutes assuming a constant speed?
 - A. 3112 B. 3477
 - C. 3534 D. 3522
- 63. A tap can empty a tank in 30 minutes while a second tap can empty it in 20 minutes. If both the taps are kept open, how much time is required to empty the tank?

A.	20 minutes	В.	12 minutes
C.	25 minutes	D.	55 minutes

64. A train starts from A towards B with a speed 75km/h. Another train starts from B with a speed of 60km/h towards A. Both of them meet after 12 minutes. Find the distance between A and B

Α.	30 km	В.	65 km
C.	25 km	D.	27 km

65. Two metro trains start at the same time from the same station 300km apart going in opposite directions cross each other at a distance of 180 km. What is the ratio of their speeds?

Α.	3:2	В.	3:4
C.	2:3	D.	4 : 5

66. Identify the number in this series; 8, 6, 9, 23, 87,... What number should come next?

Α.	126	В.	429
C.	324	D.	249

67. Which of the following is NOT a database management software?

Α.	MySQL	В.	Oracle
C.	SQL	D.	Pascal

- 68. Sum of squares if three natural numbers is 149. Then the sum of these numbers is
 - A. 20 B. 21
 - C. 24 D. 26
- 69. In a row of students, Sumesh is 14th from the left and Suresh is 18th from right. If they interchange their positions, Sumesh becomes 6th from left. Then what will be the position of Suresh from the right?

A.	21 st	В.	20 th
C.	10 th	D.	9^{th}

70.	$\sqrt{22}$	$21^2 - 220^2$		
	Α.	1	В.	441
	C.	21	D.	None of these

71. When the two hands are in opposite direction then what is the difference of degree and min between the two hands?

Α.	180° and 15 min	В.	180° and 30 min
C.	60° and 15 min	D.	120° and 10 min

72. If A = 1, B = 2, C = 3 and so on until Z = 26, what is the numerical value of the word "LOGIC"?

Α.	21	В.	27
C.	54	D.	63

73. Five friends – Nisha, Bobby, Ramesh, David and Thomas – are sitting around a round table. If Nisha is to the left of David and Bobby is to the right of Ramesh, who is sitting between Nisha and Bobby?

Α.	Ramesh	В.	David
C.	Thomas	D.	None

74. In a group of 80 people, 45 people like coffee, 50 people like tea, and 20 people like both coffee and tea. How many people in the group do not like either coffee or tea?

Α.	10	В.	15
C.	25	D.	30

75. Find the number of triangles in the given figure.



76. Find the minimum number of straight lines required to make the given figure.



77. In a row of certain persons, Sam is sitting 285 from the left end and 412 from the right end. Find out the total number of persons in that row?

A.	697	В.	698
C.	696	D.	None of the above

78. The positions of how many digits in the number 2451479638 will remain same when the first half and the second half of the digits are arranged in ascending order separately?

A.	Only one	В.	Two
C.	Three	D.	None

- C. Three D. None
- 79. Assertion: (L) A saltwater fish drinks seawater whereas a freshwater fish never drinks water.
 - Reason: (R) A saltwater fish is hypertonic to its environment while a freshwater fish is not hypertonic to its environment.
 - A. If both (L) and (R) are true and (R) is the correct explanation of (A)
 - B. If both (L) and (R) are true and (R) is not the correct explanation of (A)
 - C. If (L) is true, but (R) is false
 - D. If (L) is false, but (R) is true
- 80. Pointing to a woman in the photograph, person 'A' said, "The only daughter of her grandfather is my Wife". How is 'A related to that woman?
 - A. Uncle B. Father
 - C. Maternal uncle D. Brother

81.	. ————— has the highest pH value.								
	Α.	Water	В.	Wine					
	C.	Caustic soda	D.	Lime juice					
82.	Whi	ch of the following bonds electro	ns are	transferred?					
	Α.	Covalent	В.	lonic					
	C.	Hydrogen	D.	None of these					
83.	KBJ	I, LCK, MDL, NEM,							
	Α.	OEP	В.	OFN					
	C.	MEN	D.	PFQ					
84.	An prot as f prot	examination of 3hr duration had plems. It is stated that twice as r for each other question. How m plems.	as 200 nuch ti any m) questions of which 50 are physics me be spent on each physics problem inutes are to be spent on the physics					
	Α.	36	В.	72					
	C.	60	D.	100					
85.	A bo velo	oat is moving upstream with velo ocity of 40 km/br, calculate the sp	city of beed of	14 km/hr and goes downstream with a the stream?					
	Α.	13 km/hr	В.	26 km/hr					
	C.	34 km/hr	D.	None of these					
86.	Wha into	at is the smallest number by wh a perfect square?	ich 288	30 must be divided in order to make it					
	Α.	3	В.	4					
	C.	5	D.	6					
87.	DN	N, FPP, HRR,, L'	VV						
	Α.	GRR	В.	OSS					
	C.	JTT	D.	ITT					
88.	Stat Stat	tement 1 : Pens cost more th tement 2 : Pens cost less that	nan per an eras	ncils. sers.					
	Stat	tement 3 : Erasers cost more	e than	pencils and pens.					
	lf th	e first two statements are true, th	ne third	statement is					
	•	T							

- A. True B. False
- C. Uncertain D. Cannot be determined

- 89. If in a certain language, MADRAS is coded as NBESBT, how is BOMBAY coded in that code?
 - A. CPNCBN B. CPNCBZ
 - C. CPOCBZ D. CQOCBZ
- 90. Four usual dice are thrown on the ground. The total of numbers on the top faces of these four dice is 13 as the top faces showed 4, 3, 1 and 5 respectively. What is the total of the faces touching the ground?
 - A. 12 B. 13
 - C. 15 D. Cannot be determined
- 91. I am facing East. Turning to the right I go 20 m, then turning to the left I go 20 m and turning to the right I go 20 m, then again turning to the right I go 40 m and then again I go 40 m to the right. In which direction am I from my original position?

Α.	North	В.	West
C.	South	D.	East

- 92. Q, R, S and T are sitting on a bench. P is sitting next to Q, R is sitting next to S, S is not sitting with T who is on the left end of the bench. R is in the second position from the right. P is to the right of Q and T. P and R are sitting together. In which position P is sitting?
 - A. Between Q and S B. Betwee
 - C. Between Q and R

- B. Between T and S
- n Q and R
- D. Between R and T



94. January, May, July, November. Find the odd month out

- A. January B. May
- C. July D. November

95. 6, 9, 15, 18, 24, 26. Find the odd number out

- A. 6 B. 15
- C. 24 D. 26

96. If DELHI is coded as CCIDD how would you encode BOMBAY

A. AJMTVTB. AMJXVSC. MJXVSUD. WXYZAX

97. Gravity is related to pull in the same way as Magnetism is related to:

- A. Repulsion B. Separation
- C. Attraction D. Push
- 98. Select the pair from the following options, which has the same relationship like POSTSCRIPT : LETTER
 - A. PREAMBLE : DOCUMENT B. GLOSSARY : REFERENCE
 - C. EPILOGUE : PLAY D. SIGNATURE : PEN
- 99. B is twice as old as A but twice younger than F. C is half the age of A but is twice older than D. Who is the second oldest?
 - A. B B. F C. C D. D
- 100. If Football is called Cricket, Cricket is called Basketball, Basketball is called Badminton, Badminton is called Volleyball, Volleyball is called Hockey and Hockey is called Golf, then which of the following games is not played using a ball?

A. Volleyball B. B	Basketball
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C. Hockey D. Cricket

ANSWER SHEET

1	A	В	С	D	Е
2	Α	В	С	D	Е
3	А	В	С	D	Е
4	А	В	С	D	Е
5	А	В	С	D	Е
6	Α	В	С	D	Е
7	А	В	С	D	Е
8	А	В	С	D	Е
9	А	В	С	D	Е
10	А	В	С	D	Е
11	А	В	С	D	Е
12	А	В	С	D	Е
13	А	В	С	D	Е
14	А	В	С	D	Е
15	А	В	С	D	Е
16	А	В	С	D	Е
17	Α	В	С	D	Е
18	Α	В	С	D	Е
19	Α	В	С	D	Е
20	А	В	С	D	Е
21	Α	В	С	D	Е
22	Α	В	С	D	Е
23	Α	В	С	D	Е
24	Α	В	С	D	Е
25	Α	В	С	D	Е

26	Α	В	С	D	Е
27	Α	В	С	D	Е
28	Α	В	С	D	Е
29	Α	В	С	D	Е
30	А	В	С	D	Е
31	Α	В	С	D	Е
32	А	В	С	D	Е
33	А	В	С	D	Е
34	Α	В	С	D	Е
35	Α	В	С	D	Е
36	Α	В	С	D	Е
37	Α	В	С	D	Е
38	Α	В	С	D	Е
39	Α	В	С	D	Е
40	Α	В	С	D	Е
41	Α	В	С	D	Е
42	Α	В	С	D	Е
43	Α	В	С	D	Е
44	А	В	С	D	Ε
45	Α	В	С	D	Е
46	Α	В	С	D	Е
47	Α	В	С	D	Е
48	Α	В	С	D	Е
49	A	В	С	D	E
FO	٨	Р	0	D	F

26	А	В	С	D	Е	51	А	В	С	D	Е
27	А	В	С	D	Е	52	А	В	С	D	Е
28	А	В	С	D	Е	53	Α	В	С	D	Ε
29	А	В	С	D	Е	54	Α	В	С	D	Е
30	А	В	С	D	Е	55	Α	В	С	D	Е
31	А	В	С	D	Е	56	Α	В	С	D	Е
32	Α	В	С	D	Е	57	Α	В	С	D	Е
33	А	В	С	D	Е	58	Α	В	С	D	Е
34	А	В	С	D	Е	59	Α	В	С	D	Е
35	А	В	С	D	Е	60	Α	В	С	D	Е
36	А	В	С	D	Е	61	Α	В	С	D	Е
37	Α	В	С	D	Е	62	Α	В	С	D	Е
38	Α	В	С	D	Е	63	Α	В	С	D	Е
39	Α	В	С	D	Е	64	Α	В	С	D	Е
40	Α	В	С	D	Е	65	Α	В	С	D	Е
41	Α	В	С	D	Ε	66	Α	В	С	D	Е
42	Α	В	С	D	Е	67	Α	В	С	D	Е
43	Α	В	С	D	Е	68	Α	В	С	D	Е
44	Α	В	С	D	Е	69	Α	В	С	D	Е
45	А	В	С	D	Е	70	Α	В	С	D	Е
46	Α	В	С	D	Е	71	Α	В	С	D	Е
47	Α	В	С	D	Е	72	Α	В	С	D	Е
48	А	В	С	D	Е	73	Α	В	С	D	Е
49	А	В	С	D	Е	74	Α	В	С	D	Е
50	Α	В	С	D	Е	75	Α	В	С	D	Е



T - 2120

ROUGH WORK

ROUGH WORK

ROUGH WORK